# GENETICS

A PERIODICAL RECORD OF INVESTIGATIONS
BEARING ON HEREDITY AND VARIATION

FOUNDED IN 1916

*and published by*

THE GENETICS SOCIETY OF AMERICA

VOLUME 170, MAY–AUGUST 2005

# EDITORIAL BOARD


**ELIZABETH W. JONES**, *Editor-in-Chief*
Carnegie Mellon University, Pittsburgh, PA

MONTSERRAT AGUADÉ (2005)
Universitat de Barcelona

KATHRYN V. ANDERSON (2005)
Sloan-Kettering Institute

BRENDA J. ANDREWS (2006)
University of Toronto

NORMAN ARNHEIM (2005)
University of Southern California

BONNIE BARTEL (2005)
Rice University

DAVID BEGUN (2005)
University of California, Davis

JOY BERGELSON (2005)
University of Chicago

JAMES A. BIRCHLER (2005)
University of Missouri

DAVID BOTSTEIN (2006)
Princeton University

KARL W. BROMAN (2006)
Johns Hopkins University

ANTHONY H. D. BROWN (2006)
CSIRO Division of Plant Industry

VICKI L. CHANDLER (2004)
University of Arizona

DEBORAH CHARLESWORTH (2005)
University of Edinburgh

REBECCA DOERGE (2005)
Purdue University

THOMAS A. EICKBUSH (2005)
University of Rochester

LAURENT EXCOFFIER (2005)
University of Bern

MARCUS W. FELDMAN (2006)
Stanford University

YUN-XIN FU (2004)
University of Texas, Houston

GREGORY C. GIBSON (2006)
North Carolina State University

KENT GOLIC (2005)
University of Utah

DAVID JONAH GRUNWALD (2004)
University of Utah

CHRIS HALEY (2006)
Roslin Institute (Edinburgh)

MICHAEL HAMPSEY (2004)
Robert Wood Johnson Medical School-UMDNJ

LAWRENCE HARSHMAN (2005)
University of Nebraska

R. SCOTT HAWLEY (2006)
Stowers Institute for Medical Research

STEVEN HENIKOFF (2005)
Fred Hutchinson Cancer Center

NANCY A. JENKINS (2004)
National Cancer Institute-FCRDC

MARK JOHNSTON (2006)
Washington University School of Medicine

MONICA J. JUSTICE (2006)
Baylor College of Medicine

THOMAS C. KAUFMAN (2006)
Indiana University

KENNETH J. KEMPHUES (2006)
Cornell University

CHRISTINE KOZAK (2005)
National Institute of Health-NIAID

MICHAEL LICHTEN (2006)
National Cancer Institute

A. JAVIER LOPEZ (2005)
Carnegie Mellon University

JENNIFER J. LOROS (2004)
Dartmouth Medical School

SUSAN LOVETT (2004)
Brandeis University

SUSAN R. MCCOUCH (2005)
Cornell University

BARBARA J. MEYER (2005)
University of California, Berkeley

AARON P. MITCHELL (2004)
Columbia University

ALAIN NICOLAS (2006)
Institut Curie

HOWARD OCHMAN (2005)
University of Arizona

PETER J. OEFNER (2005)
Stanford University

SARA P. OTTO (2004)
University of British Columbia

ANDREW PATERSON (2004)
University of Georgia

LORRAINE PILLUS (2006)
University of California, San Diego

PATRICIA J. PUKKILA (2004)
University of North Carolina

DAVID RAND (2006)
Brown University

MARK D. ROSE (2004)
Princeton University

PAUL RUSSELL (2005)
The Scripps Research Institute

MATTHEW S. SACHS (2004)
Oregon Health and Science University

SUZANNE SANDMEYER (2004)
University of California, Irvine

OUTI SAVOLAINEN (2005)
University of Oulu

STEPHEN W. SCHAEFFER (2006)
The Pennsylvania State University

TRUDI SCHÜPBACH (2005)
Princeton University

MICHAEL J. SIMMONS (2006)
University of Minnesota

GERALD R. SMITH (2004)
Fred Hutchinson Cancer Center

ABRAHAM L. SONENSHEIN (2004)
Tufts University School of Medicine

HAMISH GORDON SPENCER (2006)
University of Otago

TIM STEARNS (2004)
Stanford University

VENKATESAN SUNDARESAN (2006)
Institute of Molecular Agrobiology

LORRAINE S. SYMINGTON (2005)
Columbia University College of Physicians and Surgeons

NAOYUKI TAKAHATA (2005)
Graduate University, Kanagawa

JOHN TAMKUN (2005)
University of California, Santa Cruz

SIMON TAVARÉ (2005)
University of Southern California

MARCY K. UYENOYAMA (2004)
Duke University

MICHEL A. VEUILLE (2006)
Ecole Pratique des Hautes Etudes, Paris

ANNE M. VILLENEUVE (2006)
Stanford University School of Medicine

DANIEL F. VOYTAS (2005)
Iowa State University

JOHN WAKELEY (2006)
Harvard University

J. BRUCE WALSH (2005)
University of Arizona

DETLEF WEIGEL (2005)
Max Planck Institute

SUE WESSLER (2006)
University of Georgia

FRED WINSTON (2006)
Harvard Medical School

ZIHENG YANG (2005)
University College London

MENG-CHAO YAO (2006)
Fred Hutchinson Cancer Research Center

SHOZO YOKOYAMA (2005)
Syracuse University

MIRIAM E. ZOLAN (2004)
Indiana University



Managing Editor, TRACEY DEPELLEGRIN CONNELLY
Published at Baltimore, Maryland
by the GENETICS SOCIETY OF AMERICA

*Pre-publication services and printing by Capital City Press, Inc.*

# VOLUME CONTENTS

## to Volume 170, May–August, 2005


AJIE, BEVERLY C., SUZANNE ESTES, MICHAEL LYNCH AND PATRICK C. PHILLIPS, Behavioral degradation under mutation accumulation in *Caenorhabditis elegans* ..... 655–660

ALLAN, MARK F., EUGENE J. EISEN AND DANIEL POMP, Genomic mapping of direct and correlated responses to long-term selection for rapid growth rate in mice ..... 1863–1877

ÁLVAREZ-CASTRO, JOSÉ M., AND GONZALO ALVAREZ, Models of general frequency-dependent selection and mating-interaction effects and the analysis of selection patterns in Drosophila inversion polymorphisms ..... 1167–1179

ANDERSON, ERIC C., An efficient Monte Carlo method for estimating $N_e$ from temporally spaced samples using a coalescent-based likelihood ..... 955–967

ARMSTRONG, JENNIFER A., ADAM S. SPERLING, RENATE DEURING, LAURINA MANNING, SARAH L. MOSELEY, OPHELIA PAPOULAS, CAROLINE I. PIATEK, CHRIS Q. DOE AND JOHN W. TAMKUN, Genetic screens for enhancers of *brahma* reveal functional interactions between the BRM chromatin-remodeling complex and the Delta-Notch signal transduction pathway in Drosophila ..... 1761–1774

BAKER, PHILLIP W., KATHLEEN K. KELLY TANAKA, NIELS KLITGORD AND RICHARD M. CRIPPS, Adult myogenesis in *Drosophila melanogaster* can proceed independently of myocyte enhancer factor-2 ..... 1747–1759

BALL, RODERICK D., Experimental designs for reliable detection of linkage disequilibrium in unstructured random population association studies ..... 859–873

BARAHONA, ANA, AND FRANCISCO J. AYALA, Theodosius Dobzhansky's role in the emergence and institutionalization of genetics in Mexico ..... 981–987

BENNETT, KRISTINE E., DON FLICK, KAREN H. FLEMING, RYAN JOCHIM, BARRY J. BEATY AND WILLIAM C. BLACK IV, Quantitative trait loci that control dengue-2 virus dissemination in the mosquito *Aedes aegypti* ..... 185–194

BERRY, DONALD A., DEANNE WRIGHT, CHONGQING XIE, JON D. SELTZER AND J. STEPHEN C. SMITH, Using molecular sizes of simple sequence repeats *vs.* discrete binned data in assessing probability of ancestry: Application to maize hybrids ..... 365–374

BHAT, KRISHNA MOORTHI, Slit-Roundabout signaling neutralizes Netrin-Frazzled-mediated attractant cue to specify the lateral positioning of longitudinal axon pathways ..... 149–159

BING, NAN, AND INA HOESCHELE, Genetical genomics analysis of a yeast segregant population for transcription network inference ..... 533–542

BRAVERMAN, JOHN M., BRIAN P. LAZZARO, MONTSERRAT AGUADÉ AND CHARLES H. LANGLEY, DNA sequence polymorphism and divergence at the *erect wing* and *suppressor of sable* loci of *Drosophila melanogaster* and *D. simulans* ..... 1153–1165

BRENNER, TAMARA J., AND CHRISTINE GUTHRIE, Genetic analysis reveals a role for the C terminus of the *Saccharomyces cerevisiae* GTPase Snu114 during spliceosome activation ..... 1063–1080

BURNETTE, JAMES M., ETSUKO MIYAMOTO-SATO, MARC A. SCHAUB, JAMIE CONKLIN AND A. JAVIER LOPEZ, Subdivision of large introns in Drosophila by recursive splicing at nonexonic elements ..... 661–674

CASSIDY-HANLEY, DONNA, YELENA BISHARYAN, VLADIMIR FRIDMAN, JOSEPH GERBER, CINDY LIN, EDUARDO ORIAS, JUDITH D. ORIAS, HILARY RYDER, LINH VONG AND EILEEN P. HAMILTON, Genome-wide characterization of *Tetrahymena thermophila* chromosome breakage sites. II. Physical and genetic mapping ..... 1623–1631

Casso, David J., Soichi Tanda, Brian Biehs, Bruno Martoglio and Thomas B. Kornberg, Drosophila signal peptide peptidase is an essential protease for larval development ..... 139–148

Chang, Shu-Mei, Yingqing Lu and Mark D. Rausher, Neutral evolution of the nonbinding region of the anthocyanin regulatory gene *Ipmyb1* in Ipomoea ..... 1967–1978

Charlat, Sylvain, Claire Calmet, Olivier Andrieu and Hervé Merçot, Exploring the evolution of Wolbachia compatibility types: A simulation approach ..... 495–507

Chen, John J., Tao Duan, Richard Single, Kristie Mather and Glenys Thomson, Hardy-Weinberg testing of a single homozygous genotype ..... 1439–1442

Chibana, Hiroji, Nao Oka, Hironobu Nakayama, Toshihiro Aoyama, B. B. Magee, P. T. Magee and Yuzuru Mikami, Sequence finishing and gene mapping for *Candida albicans* chromosome 7 and syntenic analysis against the *Saccharomyces cerevisiae* genome ..... 1525–1537

Chistiakov, Dimitry A., Bart Hellemans, Chris S. Haley, Andy S. Law, Costas S. Tsigenopoulos, Georgios Kotoulas, Daniela Bertotto, Angelo Libertini and Filip A. M. Volckaert, A microsatellite linkage map of the European sea bass *Dicentrarchus labrax* L. ..... 1821–1826

Clark, Michael E., Cort L. Anderson, Jessica Cande and Timothy L. Karr, Widespread prevalence of Wolbachia in laboratory stocks and the implications for Drosophila research 1667–1675

Coffman, Cynthia J., R. W. Doerge, Katy L. Simonsen, Krista M. Nichols, Christine K. Duarte, Russell D. Wolfinger and Lauren M. McIntyre, Model selection in binary trait locus mapping ..... 1281–1297

Collins, Russell T., and Stephen M. Cohen, A genetic screen in Drosophila for identifying novel components of the Hedgehog signaling pathway ..... 173–184

Cork, Jennifer M., and Michael D. Purugganan, High-diversity genes in the Arabidopsis genome ..... 1897–1911

Couch, Brett C., Isabelle Fudal, Marc-Henri Lebrun, Didier Tharreau, Barbara Valent, Pham van Kim, Jean-Loup Nottéghem and Linda M. Kohn, Origins of host-specific populations of the blast pathogen *Magnaporthe oryzae* in crop domestication with subsequent expansion of pandemic clones on rice and weeds of rice ..... 613–630

Coulthard, Alistair B., Nadia Nolan, John B. Bell and Arthur J. Hilliker, Transvection at the *vestigial* locus of *Drosophila melanogaster* ..... 1711–1721

Cowperthwaite, Matthew C., J. J. Bull and Lauren Ancel Meyers, Distributions of beneficial fitness effects in RNA ..... 1449–1457

Cygnar, Katherine D., Xinsheng Gao, Duojia Pan and Thomas P. Neufeld, The phosphatase subunit Tap42 functions independently of target of rapamycin to regulate cell division and survival in Drosophila ..... 733–740

Davis, Luther, and Gerald R. Smith, Dynein promotes achiasmate segregation in *Schizosaccharomyces pombe* ..... 581–590

Della Vedova, Chris B., René Lorbiecke, Helene Kirsch, Michael B. Schulte, Kay Scheets, Lutz M. Borchert, Brian E. Scheffler, Udo Wienand, Karen C. Cone and James A. Birchler, The dominant inhibitory chalcone synthase allele *C2-Idf* (*Inhibitor diffuse*) from *Zea mays* (L.) acts via an endogenous RNA silencing mechanism ..... 1989–2002

Deng, Changchun, James A. Brown, Dongqing You and J. Martin Brown, Multiple endonucleases function to repair covalent topoisomerase I complexes in *Saccharomyces cerevisiae* ..... 591–600

Denver, Dee R., Seth Feinberg, Suzanne Estes, W. Kelley Thomas and Michael Lynch, Mutation rates, spectra and hotspots in mismatch repair-deficient *Caenorhabditis elegans* ..... 107–113

Desbordes, Sabrina C., Dhianjali Chandraratna and Bénédicte Sanson, A screen for genes regulating the Wingless gradient in Drosophila embryos ..... 749–766

Dixon, Cheryl, Neal Mathias, Richard M. Zweig, Donnie A. Davis and David S. Gross, α-Synuclein targets the plasma membrane via the secretory pathway and induces toxicity in yeast ..... 47–59

Drake, John W., and Charles B. C. Hwang, On the mutation rate of herpes simplex virus type 1 ..... 969–970

Edgar, Kyle A., Marcia Belvin, Annette L. Parks, Kellie Whittaker, Matt B. Mahoney, Monique Nicoll, Christopher C. Park, Christopher G. Winter, Feng Chen, Kim Lickteig, Ferhad Ahmad, Hanife Esengil, Matthew V. Lorenzi, Amanda Norton, Brent A. Rupnow, Laleh Shayesteh, Mariano Tabios, Lynn M. Young, Pamela M. Carroll, Casey Kopczynski, Gregory D. Plowman, Lori S. Friedman and Helen L. Francis-Lang, Synthetic lethality of retinoblastoma mutant cells in the Drosophila eye by mutation of a novel peptidyl prolyl isomerase gene ..... 161–171

Edwards, Kieron D., James R. Lynn, Péter Gyula, Ferenc Nagy and Andrew J. Millar, Natural allelic variation in the temperature-compensation mechanisms of the *Arabidopsis thaliana* circadian clock ..... 387–400

Engen, Steinar, Russell Lande and Bernt-Erik Saether, Effective size of a fluctuating age-structured population ..... 941–954

Estes, Suzanne, Beverly C. Ajie, Michael Lynch and Patrick C. Phillips, Spontaneous mutational correlations for life-history, morphological and behavioral characters in *Caenorhabditis elegans* ..... 645–653

Falque, Matthieu, Laurent Décousset, Delphine Dervins, Anne-Marie Jacob, Johann Joets, Jean-Pierre Martinant, Xavier Raffoux, Nicolas Ribière, Céline Ridel, Delphine Samson, Alain Charcosset and Alain Murigneux, Linkage mapping of 1454 new maize candidate gene loci ..... 1957–1966

Fay, Justin C., and Joseph A. Benavides, Hypervariable noncoding sequences in *Saccharomyces cerevisiae* ..... 1575–1587

Fernández, Jesús, Beatriz Villanueva, Ricardo Pong-Wong and Miguel Ángel Toro, Efficiency of the use of pedigree and molecular marker information in conservation programs 1313–1321

Filatov, Dmitry A., Evolutionary history of *Silene latifolia* sex chromosomes revealed by genetic mapping of four genes ..... 975–979

Force, Allan, William A. Cresko, F. Bryan Pickett, Steven R. Proulx, Chris Amemiya and Michael Lynch, The origin of subfunctions and modular gene regulation ..... 433–446

Friesen, Helena, Karen Colwill, Karen Robertson, Oliver Schub and Brenda Andrews, Interaction of the *Saccharomyces cerevisiae* cortical actin patch protein Rvs167p with proteins involved in ER to Golgi vesicle trafficking ..... 555–568

Frisch, Matthias, and Albrecht E. Melchinger, Selection theory for marker-assisted backcrossing ..... 909–917

Garrigan, Daniel, Zahra Mobasher, Sarah B. Kingan, Jason A. Wilder and Michael F. Hammer, Deep haplotype divergence and long-range linkage disequilibrium at Xp21.1 provide evidence that humans descend from a structured ancestral population ..... 1849–1856

Glasscock, Edward, Ayush Singhania and Mark A. Tanouye, The mei-P26 gene encodes a RING finger B-box coiled-coil-NHL protein that regulates seizure susceptibility in Drosophila 1677–1689

Go, Yasuhiro, Yoko Satta, Osamu Takenaka and Naoyuki Takahata, Lineage-specific loss of function of bitter taste receptor genes in humans and nonhuman primates ..... 313–326

Golovnin, Anton, Elena Melnick, Alexander Mazur and Pavel Georgiev, Drosophila Su(Hw) insulator can stimulate transcription of a weakened *yellow* promoter over a distance 1133–1142

Gross, Jeffrey M., Brian D. Perkins, Adam Amsterdam, Ana Egaña, Tristan Darland, Jonathan I. Matsui, Salvatore Sciascia, Nancy Hopkins and John E. Dowling, Identification of zebrafish insertional mutants with defects in visual system development and function 245–261

Guillot, Gilles, Arnaud Estoup, Frédéric Mortier and Jean François Cosson, A spatial statistical model for landscape genetics 1261–1280

Haag, Christoph R., Myriam Riek, Jürgen W. Hottinger, V. Ilmari Pajunen and Dieter Ebert, Genetic diversity and genetic differentiation in Daphnia metapopulations with subpopulations of known age 1809–1820

Hall, Megan C., and John H. Willis, Transmission ratio distortion in intraspecific hybrids of *Mimulus guttatus*: Implications for genomic divergence 375–386

Hall, Sarah E., Song Luo, Anne E. Hall and Daphne Preuss, Differential rates of local and global homogenization in centromere satellites from Arabidopsis relatives 1913–1927

Hambuch, Tina M., and John Parsch, Patterns of synonymous codon usage in *Drosophila melanogaster* genes with sex-biased expression 1691–1700

Hamilton, Eileen, Peter Bruns, Cindy Lin, Virginia Merriam, Eduardo Orias, Linh Vong and Donna Cassidy-Hanley, Genome-wide characterization of *Tetrahymena thermophila* chromosome breakage sites. I. Cloning and identification of functional sites 1611–1621

Hamilton, Grant, Mathias Currat, Nicolas Ray, Gerald Heckel, Mark Beaumont and Laurent Excoffier, Bayesian estimation of recent migration rates after a spatial expansion 409–417

Han, Fangpu, George Fedak, Wanli Guo and Bao Liu, Rapid and repeatable elimination of a parental genome-specific DNA repeat (pGc1R-1a) in newly synthesized wheat allopolyploids 1239–1245

Harvey, Anne C., Stephen P. Jackson and Jessica A. Downs, *Saccharomyces cerevisiae* histone H2A Ser122 facilitates DNA repair 543–553

Hayes, Sidney, Kengo Asai, Audrey M. Chu and Connie Hayes, NinR- and Red-mediated phage-prophage marker rescue recombination in *Escherichia coli*: Recovery of a nonhomologous *imm*λ DNA segment by infecting λ*imm*434 phages 1485–1499

Henry, Isabelle M., Brian P. Dilkes, Kim Young, Brian Watson, Helen Wu and Luca Comai, Aneuploidy and genetic variation in the *Arabidopsis thaliana* triploid response 1979–1988

Hess, David, and Fred Winston, Evidence that Spt10 and Spt21 of *Saccharomyces cerevisiae* play distinct roles *in vivo* and functionally interact with MCB-binding factor, SCB-binding factor and Snf1 87–94

Hood, Michael E., Melanie Katawczik and Tatiana Giraud, Repeat-induced point mutation and the population structure of transposable elements in *Microbotryum violaceum* 1081–1089

Hope, Justin C., Mohamed Maftahi and Greg A. Freyer, A postsynaptic role for Rhp55/57 that is responsible for cell death in Δ*rqh1* mutants following replication arrest in *Schizosaccharomyces pombe* 519–531

Hughes, Austin L., Bernice Packer, Robert Welch, Andrew W. Bergen, Stephen J. Chanock and Meredith Yeager, Effects of natural selection on interpopulation divergence at polymorphic sites in human protein-coding loci 1181–1187

Jansen, J., Construction of linkage maps in full-sib families of diploid outbreeding species by minimizing the number of recombinations in hidden inheritance vectors 2013–2025

Jauert, Peter A., and David T. Kirkpatrick, Length and sequence heterozygosity differentially affect *HRAS1* minisatellite stability during meiosis in yeast 601–612

Jensen, Jeffrey D., Yuseob Kim, Vanessa Bauer DuMont, Charles F. Aquadro and Carlos D. Bustamante, Distinguishing between selective sweeps and demography using DNA polymorphism data 1401–1410

Jensen, Linnea E., Peter A. Jauert and David T. Kirkpatrick, The large loop repair and mismatch repair pathways of *Saccharomyces cerevisiae* act on distinct substrates during meiosis 1033–1043

Jones, Corbin D., Andrew W. Custer and David J. Begun, Origin and evolution of a chimeric fusion gene in *Drosophila subobscura, D. madeirensis* and *D. guanche* ..... 207–219

Jung, Jeesun, Ruzong Fan and Lei Jin, Combined linkage and association mapping of quantitative trait loci by multiple markers ..... 881–898

Kastenmayer, James P., Marina S. Lee, Andrew L. Hong, Forrest A. Spencer and Munira A. Basrai, The C-terminal half of *Saccharomyces cerevisiae* Mad1p mediates spindle checkpoint function, chromosome transmission fidelity and *CEN* association ..... 509–517

Keely, Scott P., Hubert Renauld, Ann E. Wakefield, Melanie T. Cushion, A. George Smulian, Nigel Fosker, Audrey Fraser, David Harris, Lee Murphy, Claire Price, Michael A. Quail, Kathy Seeger, Sarah Sharp, Carolyn J. Tindal, Tim Warren, Eduard Zuiderwijk, Barclay G. Barrell, James R. Stringer and Neil Hall, Gene arrays at *Pneumocystis carinii* telomeres ..... 1589–1600

Khaitovich, Philipp, Svante Pääbo and Gunter Weiss, Toward a neutral evolutionary model of gene expression ..... 929–939

Kidd, Thomas, Robin Abu-Shumays, Alisa Katzen, John C. Sisson, Gerardo Jiménez, Sheena Pinchin, William Sullivan and David Ish-Horowicz, The ε-subunit of mitochondrial ATP synthase is required for normal spindle orientation during the Drosophila embryonic divisions ..... 697–708

Kim, Kwang-Seo, Eithne Feild, Natalie King, Takuro Yaoi, Sydney Kustu and William Inwood, Spontaneous mutations in the ammonium transport gene *AMT4* of *Chlamydomonas reinhardtii* ..... 631–644

Klar, Amar J. S., A 1927 study supports a current genetic model for inheritance of human scalp hair-whorl orientation and hand-use preference traits ..... 2027–2030

Kreutzer, Robert, Tosso Leeb, Gundi Müller, Andreas Moritz and Wolfgang Baumgärtner, A duplication in the canine β-galactosidase gene *GLB1* causes exon skipping and $GM_1$-gangliosidosis in Alaskan huskies ..... 1857–1861

Krupp, Joshua J., Lauren E. Yaich, Robert J. Wessells and Rolf Bodmer, Identification of genetic loci that interact with *cut* during Drosophila wing-margin development ..... 1775–1795

Kubaláková, Marie, Pavlína Kovárová, Pavla Suchánková, Jarmila Číhalíková, Jan Bartos, Sergio Lucretti, Nobuyoshi Watanabe, Shahryar F. Kianian and Jaroslav Dolezel, Chromosome sorting in tetraploid wheat and its potential for genome analysis ... 823–829

Lam, Sandy Y., Sarah R. Horn, Sarah J. Radford, Elizabeth A. Housworth, Franklin W. Stahl and Gregory P. Copenhaver, Crossover interference on nucleolus organizing region-bearing chromosomes in Arabidopsis ..... 807–812

Laviolette, Matthew J., Paula Nunes, Jean-Baptiste Peyre, Toshiro Aigaki and Bryan A. Stewart, A genetic screen for suppressors of Drosophila NSF2 neuromuscular junction overgrowth ..... 779–792

Lee, Bo-Young, Woo-Jai Lee, J. Todd Streelman, Karen L. Carleton, Aimee E. Howe, Gideon Hulata, Audun Slettan, Justin E. Stern, Yohey Terai and Thomas D. Kocher, A second-generation genetic linkage map of tilapia (*Oreochromis* spp.) ..... 237–244

Lee, Grace S., Rita M. Cantor, Arin Abnoosian, Euisun Park, Mitsuko L. Yamamoto, David N. Hovland, Jr. and Michael D. Collins, A gene(s) for all-*trans*-retinoic acid-induced forelimb defects mapped and confirmed to murine chromosome 11 ..... 345–353

Li, Dan, Piotr Bobrowicz, Heather H. Wilkinson and Daniel J. Ebbole, A mitogen-activated protein kinase pathway essential for mating and contributing to vegetative growth in *Neurospora crassa* ..... 1091–1104

Li, Lei, Kelly M. Murphy, Uliana Kanevets and Linda J. Reha-Krantz, Sensitivity to phosphonoacetic acid: A new phenotype to probe DNA polymerase δ in *Saccharomyces cerevisiae* .... 569–580

Li, Li, Josef Strahwald, Hans-Reinhard Hofferbert, Jens Lübeck, Eckart Tacke, Holger Junghans, Jörg Wunder and Christiane Gebhardt, DNA variation at the invertase locus *invGE/GF* is associated with tuber quality traits in populations of potato breeding clones 813–821

Lin, Jer-Young, Barbara Hass Jacobus, Phillip SanMiguel, Jason G. Walling, Yinan Yuan, Randy C. Shoemaker, Nevin D. Young and Scott A. Jackson, Pericentromeric regions of soybean (*Glycine max* L. Merr.) chromosomes consist of retroelements and tandemly repeated DNA and are structurally and evolutionarily labile ..... 1221–1230

Lin, Min, and Rongling Wu, Theoretical basis for the identification of allelic variants that encode drug efficacy and toxicity ..... 919–928

Locke, John, and Heather E. McDermid, Using pool noodles to teach mitosis and meiosis 5–6

Lorenzen, Marcé D., Zaldy Doyungan, Joel Savard, Kathy Snow, Lindsey R. Crumly, Teresa D. Shippy, Jeffrey J. Stuart, Susan J. Brown and Richard W. Beeman, Genetic linkage maps of the red flour beetle, *Tribolium castaneum*, based on bacterial artificial chromosomes and expressed sequence tags ..... 741–747

Lu, Chenggang, and Paul E. Mains, Mutations of a redundant α-tubulin gene affect *Caenorhabditis elegans* early embryonic cleavage via MEI-1/katanin-dependent and -independent pathways ..... 115–126

Lynn, David J., Abigail R. Freeman, Caitriona Murray and Daniel G. Bradley, A genomics approach to the detection of positive selection in cattle: Adaptive evolution of the T-cell and natural killer cell-surface protein CD2 ..... 1189–1196

Ma, Jianxin, Phillip SanMiguel, Jinsheng Lai, Joachim Messing and Jeffrey L. Bennetzen, DNA rearrangement in orthologous *Orp* regions of the maize, rice and sorghum genomes 1209–1220

Mackay, Trudy F. C., Richard F. Lyman and Faye Lawrence, Polygenic mutation in *Drosophila melanogaster*: Mapping spontaneous mutations affecting sensory bristle number ..... 1723–1735

Marais, Gabriel, Pierre Nouvellet, Peter D. Keightley and Brian Charlesworth, Intron size and exon evolution in Drosophila ..... 481–485

Masel, Joanna, Evolutionary capacitance may be favored by natural selection ..... 1359–1371

Matzkin, Luciano M., Thomas J. S. Merritt, Chen-Tseh Zhu and Walter F. Eanes, The structure and population genetics of the breakpoints associated with the cosmopolitan chromosomal inversion *In(3R)Payne* in *Drosophila melanogaster* ..... 1143–1152

Mazzoni, Cristina, Agnese Serafini and Claudio Falcone, The inactivation of *KlNOT4*, a *Kluyveromyces lactis* gene encoding a component of the CCR4-NOT complex, reveals new regulatory functions ..... 1023–1032

Melnikova, Larisa, Harald Biessmann and Pavel Georgiev, The Ku protein complex is involved in length regulation of Drosophila telomeres ..... 221–235

Moorad, Jacob A., and Michael J. Wade, A genetic interpretation of the variation in inbreeding depression ..... 1373–1384

Morishita, Masayo, and JoAnne Engebrecht, End3p-mediated endocytosis is required for spore wall formation in *Saccharomyces cerevisiae* ..... 1561–1574

Muir, William M., Incorporation of competitive effects in forest tree or animal breeding programs ..... 1247–1259

Munneke, B., K. A. Schlauch, K. L. Simonsen, W. D. Beavis and R. W. Doerge, Adding confidence to gene expression clustering ..... 2003–2011

Murthi, Athulaprabha, and Anita K. Hopper, Genome-wide screen for inner nuclear membrane protein targeting in *Saccharomyces cerevisiae*: Roles for N-acetylation and an integral membrane protein ..... 1553–1560

Mutsuddi, Mousumi, Benjamin Chaffee, Justin Cassidy, Serena J. Silver, Tina L. Tootle and Ilaria Rebay, Using Drosophila to decipher how mutations associated with human branchio-oto-renal syndrome and optical defects compromise the protein tyrosine phosphatase and transcriptional functions of eyes absent ..... 687–695

Nei, Masatoshi, Bottlenecks, genetic polymorphism and speciation ..... 1–4

Nuzhdin, Sergey V., Aziz A. Khazaeli and James W. Curtsinger, Survival analysis of life span quantitative trait loci in *Drosophila melanogaster* ..... 719–731

Oram, Kathleen F., and Thomas Gridley, Mutations in snail family genes enhance craniosynostosis of *Twist1* haplo-insufficient mice: Implications for Saethre-Chotzen syndrome .... 971–974

Page, Andrew M., Vicky Aneliunas, John R. Lamb and Philip Hieter, *In vivo* characterization of the nonessential budding yeast anaphase-promoting complex/cyclosome components Swm1p, Mnd2p and Apc9p ..... 1045–1062

Page, Jesús, Soledad Berríos, María Teresa Parra, Alberto Viera, José Ángel Suja, Ignacio Prieto, José Luis Barbero, Julio S. Rufas and Raúl Fernández-Donoso, The program of sex chromosome pairing in meiosis is highly conserved across marsupial species: Implications for sex chromosome evolution ..... 793–799

Page, Scott L., and R. Scott Hawley, The Drosophila meiotic mutant *mei-352* is an allele of *klp3A* and reveals a role for a kinesin-like protein in crossover distribution ..... 1797–1807

Pelz, Hans-Joachim, Simone Rost, Mirja Hünerberg, Andreas Fregin, Ann-Charlotte Heiberg, Kristof Baert, Alan D. MacNicoll, Colin V. Prescott, Anne-Sophie Walker, Johannes Oldenburg and Clemens R. Müller, The genetic basis of resistance to anticoagulants in rodents ..... 1839–1847

Pinto, M. Alice, William L. Rubink, John C. Patton, Robert N. Coulson and J. Spencer Johnston, Africanization in the United States: Replacement of feral European honeybees (*Apis mellifera* L.) by an African hybrid swarm ..... 1653–1665

Poon, Art, and Lin Chao, The rate of compensatory mutation in the DNA bacteriophage ϕX174 ..... 989–999

Poon, Art, Bradley H. Davis and Lin Chao, The coupon collector and the suppressor mutation: Estimating the number of compensatory mutations by maximum likelihood ..... 1323–1332

Pröschold, Thomas, Elizabeth H. Harris and Annette W. Coleman, Portrait of a species: *Chlamydomonas reinhardtii* ..... 1601–1610

Pryce, David W., Alexander Lorenz, Julia B. Smirnova, Josef Loidl and Ramsay J. McFarlane, Differential activation of *M26*-containing meiotic recombination hot spots in *Schizosaccharomyces pombe* ..... 95–106

Pyne, Saumyadipta, Steven Skiena and Bruce Futcher, Copy correction and concerted evolution in the conservation of yeast genes ..... 1501–1513

Radford, Sarah J., Elizabeth Goley, Kimberly Baxter, Susan McMahan and Jeff Sekelsky, Drosophila ERCC1 is required for a subset of MEI-9-dependent meiotic crossovers ..... 1737–1745

Rébora, Karine, Benoît Laloo and Bertrand Daignan-Fornier, Revisiting purine-histidine cross-pathway regulation in *Saccharomyces cerevisiae*: A central role for a small molecule 61–70

Regha, K., Ajit K. Satapathy and Malay K. Ray, RecD plays an essential function during growth at low temperature in the Antarctic bacterium *Pseudomonas syringae* Lz4W ..... 1473–1484

Riquelme, Meritxell, Michael P. Challen, Lorna A. Casselton and Andrew J. Brown, The origin of multiple *B* mating specificities in *Coprinus cinereus* ..... 1105–1119

Rouzine, I. M., and J. M. Coffin, Evolution of human immunodeficiency virus under selection and weak recombination ..... 7–18

Roze, Denis, and Thomas Lenormand, Self-fertilization and the evolution of recombination 841–857

Roze, Denis, François Rousset and Yannis Michalakis, Germline bottlenecks, biparental inheritance and selection on mitochondrial variants: A two-level selection model ..... 1385–1399

Sambade, Maria, Mercedes Alba, Anne M. Smardon, Robert W. West and Patricia M. Kane, A genomic screen for yeast vacuolar membrane ATPase mutants ..... 1539–1551

Sanjuán, Rafael, José M. Cuevas, Andrés Moya and Santiago F. Elena, Epistasis and the adaptability of an RNA virus ..... 1001–1008

Schöfl, Gerhard, Francesco Catania, Viola Nolte and Christian Schlötterer, African sequence variation accounts for most of the sequence polymorphism in non-African *Drosophila melanogaster* ..... 1701–1709

Sen, Śaunak, Jaya M. Satagopan and Gary A. Churchill, Quantitative trait locus study design from an information perspective ..... 447–464

Sengupta, Supratim, and Paul G. Higgs, A unified model of codon reassignment in alternative genetic codes ..... 831–840

Sha, Ky, and Andrew Fire, Imprinting capacity of gamete lineages in *Caenorhabditis elegans* 1633–1652

Sheng, Jian Rong, Maja Jagodic, Ingrid Dahlman, Kristina Becanovic, Rita Nohra, Monica Marta, Ellen Iacobaeus, Tomas Olsson and Erik Wallström, *Eae19*, a new locus on rat chromosome 15 regulating experimental autoimmune encephalomyelitis ..... 283–289

Shima, Hiroki, Masakatu Suzuki and Miki Shinohara, Isolation and characterization of novel *xrs2* mutations in *Saccharomyces cerevisiae* ..... 71–85

Smith, Jason A., Barbara Criscuolo Waldman and Alan S. Waldman, A role for DNA mismatch repair protein Msh2 in error-prone double-strand-break repair in mammalian chromosomes ..... 355–363

Smits, Bart M. G., Theo A. Peters, Joram D. Mul, Huib J. Croes, Jack A. M. Fransen, Andy J. Beynon, Victor Guryev, Ronald H. A. Plasterk and Edwin Cuppen, Identification of a rat model for Usher syndrome type 1B by *N*-ethyl-*N*-nitrosourea mutagenesis-driven forward genetics ..... 1887–1896

Sousa-Neves, Rui, Tamas Lukacsovich, Claudia Mieko Mizutani, John Locke, Lynn Podemski and J. Lawrence Marsh, High-resolution mapping of the Drosophila fourth chromosome using site-directed terminal deficiencies ..... 127–138

Stahl, Franklin W., Chi: A little sequence controls a big enzyme ..... 487–493

Suchard, Marc A., Stochastic models for horizontal gene transfer: Taking a random walk through tree space ..... 419–431

Takahashi, Aya, and Toshiyuki Takano-Shimizu, A high-frequency null mutant of an odorant-binding protein gene, *Obp57e*, in *Drosophila melanogaster* ..... 709–718

Takeuchi, Fumihiko, Kazuyuki Yanai, Toshiyuki Morii, Yuji Ishinaga, Keiko Taniguchi-Yanai, Shinobu Nagano and Norihiro Kato, Linkage disequilibrium grouping of single nucleotide polymorphisms (SNPs) reflecting haplotype phylogeny for efficient selection of tag SNPs ..... 291–304

Taylor, Michael R., Satoshi Kikkawa, Antonio Diez-Juan, Visvanathan Ramamurthy, Koichi Kawakami, Peter Carmeliet and Susan E. Brockerhoff, The zebrafish *pob* gene encodes a novel protein required for survival of red cone photoreceptor cells ..... 263–273

Tek, Ahmet L., Junqi Song, Jiri Macas and Jiming Jiang, Sobo, a recently amplified satellite repeat of potato, and its implications for the origin of tandemly repeated sequences ..... 1231–1238

ter Braak, Cajo J. F., Martin P. Boer and Marco C. A. M. Bink, Extending Xu's Bayesian model for estimating polygenic effects using markers of the entire genome ..... 1435–1438

Teuscher, F., V. Guiard, P. E. Rudolph and G. A. Brockmann, The map expansion obtained with recombinant inbred strains and intermated recombinant inbred populations for finite generation designs ..... 875–879

Tharun, Sundaresan, Denise Muhlrad, Ashis Chowdhury and Roy Parker, Mutations in the *Saccharomyces cerevisiae LSM1* gene that affect mRNA decapping and 3′ end protection 33–46

Todaka, Yuko, Yonggang Wang, Kosuke Tashiro, Nobutaka Nakashima, Takeharu Nishimoto and Takeshi Sekiguchi, Association of the GTP-binding protein Gtr1p with Rpc19p, a shared subunit of RNA polymerase I and III in yeast *Saccharomyces cerevisiae* ..... 1515–1524

Trott, Amy, Lance Shaner and Kevin A. Morano, The molecular chaperone Sse1 and the growth control protein kinase Sch9 collaborate to regulate protein kinase A activity in *Saccharomyces cerevisiae* ..... 1009–1021

Turner, Carrie J., Caroline Granycome, Rachel Hurst, Elizabeth Pohler, M. Katariina Juhola, Martti I. Juhola, Howard T. Jacobs, Lesley Sutherland and Ian J. Holt, Systematic segregation to mutant mitochondrial DNA and accompanying loss of mitochondrial DNA in human NT2 teratocarcinoma cybrids ..... 1879–1885

Úbeda, Francisco, and David Haig, On the evolutionary stability of Mendelian segregation 1345–1357

Voss, S. R., and J. J. Smith, Evolution of salamander life cycles: A major-effect quantitative trait locus contributes to discrete and continuous variation for metamorphic timing ..... 275–281

Vought, Valarie E., Mitsue Ohmachi, Min-Ho Lee and Eleanor M. Maine, EGO-1, a putative RNA-directed RNA polymerase, promotes germline proliferation in parallel with GLP-1/Notch signaling and regulates the spatial organization of nuclear pore complexes and germline P granules in *Caenorhabditis elegans* ..... 1121–1132

Wang, Hui, Yuan-Ming Zhang, Xinmin Li, Godfred L. Masinde, Subburaman Mohan, David J. Baylink and Shizhong Xu, Bayesian shrinkage estimation of quantitative trait loci parameters ..... 465–480

Wang, Yin-qiu, Ya-ping Qian, Su Yang, Hong Shi, Cheng-hong Liao, Hong-Kun Zheng, Jun Wang, Alice A. Lin, L. Luca Cavalli-Sforza, Peter A. Underhill, Ranajit Chakraborty, Li Jin and Bing Su, Accelerated evolution of the pituitary adenylate cyclase-activating polypeptide precursor gene during human origin ..... 801–806

Wang, Yong-Ming, Zhen-Ying Dong, Zhong-Juan Zhang, Xiu-Yun Lin, Ye Shen, Daowei Zhou and Bao Liu, Extensive *de novo* genomic variation in rice induced by introgression from wild rice (*Zizania latifolia* Griseb.) ..... 1945–1956

Wedekind, Claus, Mirjam Walker and Tom J. Little, The course of malaria in mice: Major histocompatibility complex (MHC) effects, but no general MHC heterozygote advantage in single-strain infections ..... 1427–1430

Werner, Jonathan D., Justin O. Borevitz, N. Henriette Uhlenhaut, Joseph R. Ecker, Joanne Chory and Detlef Weigel, *FRIGIDA*-independent variation in flowering time of natural *Arabidopsis thaliana* accessions ..... 1197–1207

Wichman, Holly A., Jack Millstein and J. J. Bull, Adaptive molecular evolution for 13,000 phage generations: A possible arms race ..... 19–31

Willer, G. B., V. M. Lee, R. G. Gregg and B. A. Link, Analysis of the zebrafish *perplexed* mutation reveals tissue-specific roles for *de novo* pyrimidine synthesis during development ..... 1827–1837

Williams, Teresa-Marie, Rebecca M. Fabbri, Jason W. Reeves and Gray F. Crouse, A new reversion assay for measuring all possible base pair substitutions in *Saccharomyces cerevisiae* 1423–1426

Witkin, Evelyn M., Remembering Rollin Hotchkiss (1911–2004) ..... 1443–1447

Wu, Guangming, Lanping Hao, Zhiming Han, Shaorong Gao, Keith E. Latham, Fernando Pardo-Manuel de Villena and Carmen Sapienza, Maternal transmission ratio distortion at the mouse *Om* locus results from meiotic drive at the second meiotic division 327–334

Wu, Rongling, and Chang-Xing Ma, A general framework for statistical linkage analysis in multivalent tetraploids ..... 899–907

Xu, Hongyan, Ranajit Chakraborty and Yun-Xin Fu, Mutation rate variation at human dinucleotide microsatellites ..... 305–312

Xu, Zongli, Fei Zou and Todd J. Vision, Improving quantitative trait loci mapping resolution in experimental crosses by the use of genotypically selected samples ..... 401–408

Yampolsky, Lev Y., and Arlin Stoltzfus, The exchangeability of amino acids in proteins 1459–1472

Yao, Hong, and Patrick S. Schnable, *Cis*-effects on meiotic recombination across distinct *a1-sh2* intervals in a common Zea genetic background ..... 1929–1944

Yi, Nengjun, Brian S. Yandell, Gary A. Churchill, David B. Allison, Eugene J. Eisen and Daniel Pomp, Bayesian model selection for genome-wide epistatic quantitative trait loci analysis ..... 1333–1344

Yokoyama, Shozo, Naomi Takenaka, Dalen W. Agnew and Jeheskel Shoshani, Elephants and human color-blind deuteranopes have identical sets of visual pigments ..... 335–344

Yoshido, Atsuo, Hisanori Bando, Yuji Yasukochi and Ken Sahara, The *Bombyx mori* karyotype and the assignment of linkage groups ..... 675–685

Zhang, Xian, and Thomas H. Eickbush, Characterization of active R2 retrotransposition in the rDNA locus of *Drosophila simulans* ..... 195–205

Zhu, Lan, and Carlos D. Bustamante, A composite-likelihood approach for detecting directional selection from DNA sequence data ..... 1411–1421

Zhu, Min Yan, Robert Wilson and Maria Leptin, A screen for genes that influence fibroblast growth factor signal transduction in Drosophila ..... 767–777

Zluvova, Jitka, Bohuslav Janousek, Ioan Negrutiu and Boris Vyskot, Comparison of the X and Y chromosome organization in *Silene latifolia* ..... 1431–1434

Zou, Fei, Jonathan A. L. Gelfond, David C. Airey, Lu Lu, Kenneth F. Manly, Robert W. Williams and David W. Threadgill, Quantitative trait locus analysis using recombinant inbred intercrosses: Theoretical and empirical considerations ..... 1299–1311